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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,272	01/14/2005	Toshiro Yamada	80585(302765)	4526
21874 7590 07/27/2009 EDWARDS ANGELL PALMER & DODGE LLP P.O. BOX 55874 BOSTON, MA 02205				
EXAMINER				
AHMED, SHAMIM				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
07/27/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/520,272

**Applicant(s)**

YAMADA ET AL.

**Examiner**

Shamim Ahmed

**Art Unit**

1792

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2 and 6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 4/30/09 have been fully considered but they are not persuasive. Applicant's argue that Nakamura et al do not teach a fluorine containing gas perfluoro-2-pentyne is more suitable than perfluoro-2-butyne, for a dry etching method wherein a resist film is irradiated with radiation with a wavelength of not greater than 195 nm to form a resist pattern having a minimum line width of not greater than 200 nm, and the thus-formed resist pattern is subjected to dry etching. Nowhere is this taught by combining the references.

Applicants also pointed out that Nakamura et al do not give any working example for using perfluoro-2-pentyne during the etching process.

In response to the argument, examiner state that the argument is not persuasive because a preferred embodiment or working example of a specific gas does not exclude the use of other similar gases that can be used in the etching process of the substrate as Nakamura et al suggest the advantages of such fluorine –containing gases during etching silicon-containing substrates.

Examiner noted that Sato et al teach the formation of the resist pattern of about 180nm line width by irradiating resist layer with a radiation having a wavelength of 195 nm except the claimed fluorocarbon gas (see the rejection).

However, Nakamura et al disclose that both the fluorine containing gas perfluoro-2-pentyne and perfluoro-2-butyne for dry etching method of silicon-containing material

and such dry etching gases are more environmentally acceptable in order to achieve precise etching and the motivational statement is provided (see also the rejection).

Therefore, one of ordinary skilled in the art would have been motivated to replace Sato et al's fluorine containing gas with Nakamura et al's environmentally friendly fluorine-containing gas for precise etching of the silicon-containing substrate as suggested by Nakamura et al.

So, the previous rejection sustained and repeated herein as follows:

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al (6,270,948) in view of Nakamura et al (WO 02/39494 A1).

Sato et al disclose a plasma etching process including the step of etching a substrate through a photoresist pattern, wherein the photoresist film (col.72, lines 6-18) is irradiated with a radiation having a wavelength of 195nm to form a resist pattern of about 180 nm width (col.72, lines 22-30 and lines 41-49).

Sato et al disclose that the substrate is etched with fluorine-containing plasma gas (col.73, lines 4-8).

Sato et al fail to teach the fluorine-containing compound of perfluoro-2-pentyne as an etching gas.

However, Nakamura et al teach a dry etching process using an etching gas comprises perfluoro -2-Pentyne, 1,1,1,4,4,5,5,5-octafluoro-) with the formula of  $\text{CF}_3\text{C}\equiv\text{C}-\text{CF}_2-\text{CF}_3$  and said dry etching gas is environmentally acceptable and suitable for precision fabrication of fine circuit boards (see the abstract, page 3 and also the entire document for the showing of the use of various similar gases).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to modify Sato et al's etching gas with Nakamura et al's etching gas for achieving precise etching and environmentally acceptable condition during the etching process as suggested by Nakamura et al.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al (6,270,948) in view of Nakamura et al (WO 02/39494 A1) as applied to claims 1,2 above, and further in view of Collins et al (5,556,501).

Modified Sato et al discusses above in the paragraph 4 but remain silent regarding the claimed plasma density.

However, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to perform the etching utilizing the modified teaching of Sato et al using the claimed plasma density, which is supported by Collins et al for a desired result.

Collins et al illustrate a plasma apparatus is used to form plasma having plasma density of  $1\text{-}2 \times 10^{12}$  ions/cm<sup>3</sup> (col.24, lines 48-52).

#### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on Tu-Fri (6:00-2:30) Every Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Shamim Ahmed  
Primary Examiner  
Art Unit 1792

SA  
July 26, 2009

/Shamim Ahmed/  
Primary Examiner, Art Unit 1792